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Final Technical Report
for
NASA/Headquarters Grant No. NAGW-938
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Date: June 4, 1993.

We have measured differential elastic scattering cross sections and differential vibrational excitation cross sections of water vapor and methane by electron impact. A crossed-beam method was used. The energy and angular range of the elastic cross sections measured were from 2.2 to 200 eV for wator vapor, from 5 to 50 eV for methane and from 12° to 156°, respectively. The results of the elastic cross sections of water vapor have been published in Phys. Rev. A. The energy and angular range of the vibrational excitation cross sections measured were from 2.2 to 20 eV for water vapor and from 5.0 to 15 eV for methane and from 12° to 156°, respectively. The results of vibrational excitation cross sections of water vapor and methane have been published in Phys. Rev. A and J. Phys. B, respectively.

List of Publications

1 Vibrationally elastic cross sections of water vapor by electron impact at room temperature: 2.2 -20 eV, T.W. Shyn and S.A. Cho, Phys. Rev. A36 , 5138, 1987

2. Vibrationally excitation cross sections of water vapor in ground state by electron impact. T.W.Shyn, S.Y.Cho and T.E. Craverns. Phys. Rev. A38, 678, 1988.

3. Angular distribution of electrons elastically scattered from methane, T. W. Shyn and T.E. Cravens, J. Phys. B23. 293,1990

4. Angular distribution of electrons elastically scattered from water vapor, Tong W. Shyn and Alan Grafe, Phys. Rev. A 46, 4406,1992

5. Vibrational excitation cross sections of methane by electron impact, T.W. Shyn, J. Phys. B24, 5169, 1991